SEQUENCE LISTING

<110>   CHAE. Young-Jin
         CHOI. Eun-Wha

<120>   Recombinant peptide vector comprising the gene for treatment for
         autoimmune diseases

<130>   OP04-1086

<160>   23

<170>   Kopatentln 1.71

<210>   1
<211>   20
<212>   DNA
<213>   Artificial Sequence

<220>
<223>   primer

<400>   1
aagacctgaa cactgctcca   20

<210>   2
<211>   20
<212>   DNA
<213>   Artificial Sequence

<220>
<223>   primer

<400>   2
ttgaaattgc ctcagctcct   20

<210>   3
<211>   20
<212>   DNA
<213>   Artificial Sequence

<220>
<223>   primer

<400>   3
gataacagtc atccgtgtca   20

<210>   4
<211>   20
<212>   DNA
<213>   Artificial Sequence

<220>
<223>   primer

<400>   4
gtagcagatg ccgtccacct   20

<210>   5
<211>   66
<212>   DNA
<213>   Artificial Sequence

<220>
<223>   primer

<400>   5
ctcagtctgg tccttgcact cctgtttcca agcatggcga gcatgtccaa agggatgcat   60

gtggct   66

<210>   6
<211>   27
<212>   DNA
<213>   Artificial Sequence

<220>
<223>   primer

<400>   6
gaattcgtca gaatctgggc aaggttc   27

<210>   7
<211>   61
<212>   DNA
<213>   Artificial Sequence

<220>
<223>   primer

<400>   7
aagcttcacc atgggtgtac tgctcacaca gaggacgctg ctcagtctgg tccttgcact   60

c   61

<210>   8
<211>   27
<212>   DNA
<213>   Artificial Sequence

<220>
<223>   primer

<400>   8
gaattcgata acagtcatcc gtctcat   27

<210>   9
<211>   24
<212>   DNA
<213>   Artificial Sequence

<220>
<223>   primer

<400>   9
tctagagtag cagatgccgt ccac   24

<210>   10
<211>   21
<212>   DNA
<213>   Artificial Sequence

<220>
<223>   primer

<400>   10
gccagatata cgcgttgaca t   21

```
<210>    11
<211>    18
<212>    DNA
<213>    Artificial Sequence

<220>
<223>    primer


<400>    11
gcttaatgcg ccgctaca                                                    18


<210>    12
<211>    2213
<212>    DNA
<213>    Artificial Sequence

<220>
<223>    therapeutic gene


<400>    12
gttgacattg attattgact agttattaat agtaatcaat tacggggtca ttagttcata    60

gcccatatat ggagttccgc gttacataac ttacggtaaa tggcccgcct ggctgaccgc    120

ccaacgaccc cgcccattg  acgtcaataa tgacgtatgt tcccatagta acgccaatag    180

ggactttcca ttgacgtcaa tgggtggagt atttacggta aactgcccac ttggcagtac    240

atcaagtgta tcatatgcca agtacgcccc ctattgacgt caatgacggt aaatggcccg    300

cctggcatta tgcccagtac atgaccttat gggactttcc tacttggcag tacatctacg    360

tattagtcat cgctattacc atggtgatgc ggttttggca gtacatcaat gggcgtggat    420

agcggtttga ctcacgggga tttccaagtc tccacccat  tgacgtcaat gggagtttgt    480

tttggcacca aaatcaacgg gactttccaa aatgtcgtaa caactccgcc ccattgacgc    540

aaatgggcgg taggcgtgta cggtgggagg tctatataag cagagctctc tggctaacta    600

gagaacccac tgcttactgg cttatcgaaa ttaatacgac tcactatagg gagacccaag    660

ctggctagcg tttaaactta agcttcacca tgggtgtact gctcacacag aggacgctgc    720

tcagtctggt ccttgcactc ctgtttccaa gcatggcgag catgtccaaa gggatgcatg    780

tggctcagcc tgcagtggtt ctggccagca gccggggtgt tgctagcttc gtgtgtgaat    840
```

```
atgggtcttc aggcaacgca gccgaggtcc gggtgacagt gctgcggcag gctggcagcc          900

agatgactga agtctgtgcc gcgacataca cagtggagga tgagttggcc ttcctggatg          960

attctacctg cactggcacc tccagtggaa acaaagtgaa cctcaccatc caagggttga         1020

gggccatgga cacggggctc tacatctgca aggtggagct catgtaccca ccaccctact         1080

atgtaggcat gggaaatgga acccagattt atgtcatcga tcctgaacct tgcccagatt         1140

ctgacgaatt cgataacagt catccgtctc atccatctcc ctcgtccaat gagccccgcc         1200

tgtcactaca gaagccagcc ctcgaggatc tgcttttagg ctccaatgcc agcctcacat         1260

gcacactgag tggcctgaaa gaccccaagg gtgccacctt cacctggaac ccctccaaag         1320

ggaaggaacc catccagaag aatcctgagc gtgactcctg tggctgctac agtgtgtcca         1380

gtgtcctacc aggctgtgct gatccatgga accatgggga caccttctcc tgcacagcca         1440

cccaccctga atccaagagc ccgatcactg tcagcatcac caaaaccaca gagcacatcc         1500

cgccccaggt ccacctgctg ccgccgccgt cggaagagct ggccctcaat gagctggtga         1560

cactgacgtg cttggtgagg ggcttcaaac caaaagatgt gctcgtacga tggctgcaag         1620

ggacccagga gctaccccaa gagaagtact tgacctggga gcccctgaag gagcctgacc         1680

agaccaacat gtttgccgtg accagcatgc tgagggtgac agccgaagac tggaagcagg         1740

gggagaagtt ctcctgcatg gtgggccacg aggctctgcc catgtccttc acccagaaga         1800

ccatcgaccg cctggcgggt aaacccaccc acgtcaacgt gtctgtggtc atggcagagg         1860

tggacggcat ctgctactaa tctagagggc ccgtttaaac ccgctgatca gcctcgactg         1920

tgccttctag ttgccagcca tctgttgttt gcccctcccc cgtgccttcc ttgaccctgg         1980

aaggtgccac tcccactgtc ctttcctaat aaaatgagga aattgcatcg cattgtctga         2040

gtaggtgtca ttctattctg gggggtgggg tggggcagga cagcaagggg gaggattggg         2100

aagacaatag caggcatgct ggggatgcgg tgggctctat ggcttctgag gcggaaagaa         2160

ccagctgggg ctctaggggg tatccccacg cgccctgtag cggcgcatta agc              2213
```

```
<210>    13
<211>    20
```

<212>   DNA
<213>   Artificial Sequence

<220>
<223>   primer

<400>   13
aagacctgaa caccgctccc   20

<210>   14
<211>   21
<212>   DNA
<213>   Artificial Sequence

<220>
<223>   primer

<400>   14
gttagaattg cctcagctct t   21

<210>   15
<211>   23
<212>   DNA
<213>   Artificial Sequence

<220>
<223>   primer

<400>   15
gagcccaaat cttgtgacaa aac   23

<210>   16
<211>   20
<212>   DNA
<213>   Artificial Sequence

<220>
<223>   primer

<400>   16
agcatcctcg tgcgaccgcg   20

```
<210>    17
<211>    65
<212>    DNA
<213>    Artificial Sequence

<220>
<223>    primer


<400>    17
ctcagtctgg tccttgcact cctgtttcca agcatggcga gcatggcaat gcacgtggcc          60

cagcc                                                                       65


<210>    18
<211>    66
<212>    DNA
<213>    Artificial Sequence

<220>
<223>    primer


<400>    18
gaattcgagc ccaaatcttc tgacaaaact cacacatccc caccgtcccc agcacctgaa          60

ctcctg                                                                      66


<210>    19
<211>    31
<212>    DNA
<213>    Artificial Sequence

<220>
<223>    primer


<400>    19
tctagaagca tcctcgtgcg accgcgagag c                                         31


<210>    20
<211>    2446
<212>    DNA
<213>    Artificial Sequence

<220>
<223>    therapeutic gene
```

<400> 20

gttgacattg	attattgact	agttattaat	agtaatcaat	tacggggtca	ttagttcata	60
gcccatatat	ggagttccgc	gttacataac	ttacggtaaa	tggcccgcct	ggctgaccgc	120
ccaacgaccc	ccgcccattg	acgtcaataa	tgacgtatgt	tcccatagta	acgccaatag	180
ggactttcca	ttgacgtcaa	tgggtggagt	atttacggta	aactgcccac	ttggcagtac	240
atcaagtgta	tcatatgcca	agtacgcccc	ctattgacgt	caatgacggt	aaatggcccg	300
cctggcatta	tgcccagtac	atgaccttat	gggactttcc	tacttggcag	tacatctacg	360
tattagtcat	cgctattacc	atggtgatgc	ggttttggca	gtacatcaat	gggcgtggat	420
agcggtttga	ctcacgggga	tttccaagtc	tccaccccat	tgacgtcaat	gggagtttgt	480
tttggcacca	aaatcaacgg	gactttccaa	aatgtcgtaa	caactccgcc	ccattgacgc	540
aaatgggcgg	taggcgtgta	cggtgggagg	tctatataag	cagagctctc	tggctaacta	600
gagaacccac	tgcttactgg	cttatcgaaa	ttaatacgac	tcactatagg	gagacccaag	660
ctggctagcg	tttaaactta	agcttcacca	tgggtgtact	gctcacacag	aggacgctgc	720
tcagtctggt	ccttgcactc	ctgtttccaa	gcatggcgag	catggcaatg	cacgtggccc	780
agcctgctgt	ggtactggcc	agcagccgag	gcatcgccag	ctttgtgtgt	gagtatgcat	840
ctccaggcaa	agccactgag	gtccgggtga	cagtgcttcg	gcaggctgac	agccaggtga	900
ctgaagtctg	tgcggcaacc	tacatgatgg	ggaatgagtt	gaccttccta	gatgattcca	960
tctgcacggg	cacctccagt	ggaaatcaag	tgaacctcac	tatccaagga	ctgagggcca	1020
tggacacggg	actctacatc	tgcaaggtgg	agctcatgta	cccaccgcca	tactacctgg	1080
gcataggcaa	cggaacccag	atttatgtaa	ttgatccaga	accgtgccca	gattctgacg	1140
aattcgagcc	caaatcttgt	gacaaaactc	acacatgccc	accgtgccca	ggtaagccag	1200
cccaggcctc	gccctccagc	tcaaggcggg	acaggtgccc	tagagtagcc	tgcatccagg	1260
gacaggcccc	agccgggtgc	tgacacgtcc	acctccatct	cttcctcagc	acctgaactc	1320
ctggggggac	cgtcagtctt	cctcttcccc	ccaaaaccca	aggacaccct	catgatctcc	1380
cggacccctg	aggtcacatg	cgtggtggtg	gacgtgagcc	acgaagaccc	tgaggtcaag	1440

```
ttcaactggt acgtggacgg cgtggaggtg cataatgcca agacaaagcc gcgggaggag        1500

cagtacaaca gcacgtaccg ggtggtcagc gtcctcaccg tcctgcacca ggactggctg        1560

aatggcaagg agtacaagtg caaggtctcc aacaaagccc tcccagcccc catcgagaaa        1620

accatctcca aagccaaagg tgggacccgt ggggtgcgag ggccacatgg acagaggccg        1680

gctcggccca ccctctgccc tgagagtgac cgctgtacca acctctgtcc tacagggcag        1740

ccccgagaac cacaggtgta caccctgccc ccatcccggg atgagctgac caagaaccag        1800

gtcagcctga cctgcctggt caaaggcttc tatcccagcg acatcgccgt ggagtgggag        1860

agcaatgggc agccggagaa caactacaag accacgcctc ccgtgctgga ctccgacggc        1920

tccttcttcc tctacagcaa gctcaccgtg gacaagagca ggtggcagca ggggaacgtc        1980

ttctcatgct ccgtgatgca tgaggctctg cacaaccact acacgcagaa gagcctctcc        2040

ctgtctccgg gtaaatgagt gcgacggccg gcaagccccg ctccccgggc tctcgcggtc        2100

gcacgaggat gcttctagag ggcccgttta aacccgctga tcagcctcga ctgtgccttc        2160

tagttgccag ccatctgttg tttgcccctc ccccgtgcct tccttgaccc tggaaggtgc        2220

cactcccact gtcctttcct aataaaatga ggaaattgca tcgcattgtc tgagtaggtg        2280

tcattctatt ctggggggtg gggtggggca ggacagcaag ggggaggatt gggaagacaa        2340

tagcaggcat gctggggatg cggtgggctc tatggcttct gaggcggaaa gaaccagctg        2400

gggctctagg gggtatcccc acgcgccctg tagcggcgca ttaagc                       2446
```

<210>   21
<211>   16
<212>   PRT
<213>   Artificial Sequence

<220>
<223>   N-terminal Gly is acetylated. 2nd a.a can be replaced by Ile. 4th
         a.a can be replaced by Leu. 10th a.a can be replaced by Arg. 11th
         a.a can be replaced by Lys. 13th a.a can be replaced by one of
         the Leu. Ile. Arg. Gln. Asn and Ser.

<400>   21
Gly Leu Gly Ile Ser Tyr Gly Arg Lys Lys Arg Arg Gly Arg Arg Cys

       1   5   10   15

<210>   22
<211>   17
<212>   DNA
<213>   Artificial Sequence

<220>
<223>   Linker-1 DNA: 5' end of C forms ester bond with Cys

<400>   22
ctaatacgac tcactat   17

<210>   23
<211>   16
<212>   DNA
<213>   Artificial Sequence

<220>
<223>   Linker-2 DNA

<400>   23
gattatgctg agtgat   16